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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/644,395	08/19/2003	Frederik Marcel Van Der Vliet	LT2700	6129

7590 09/23/2005  
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EXAMINER
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WOOD, KEVIN S

ART UNIT	PAPER NUMBER
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2874

DATE MAILED: 09/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/644,395

Applicant(s)

VLIET ET AL.

Examiner

Kevin S. Wood

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 28 June 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6, 8-12, 14-15, 17-22 is/are rejected.
- 7) ☒ Claim(s) 7, 13, 16 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

**NON-FINAL REJECTION**

***Election/Restrictions***

1. Applicant's election without traverse of claims 1-22 in the reply filed on 28 June 2005 is acknowledged.
2. Claims 22-34 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 28 June 2005.
3. The non-elected claims 23-34 have been cancelled in the reply filed on 28 June 2005.

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 2 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear what is meant by the "thickness of at least a portion of the contraction tapers remains substantially constant along their length". The waveguides either have a constant thickness or they are tapered, it is unclear how they can have a constant thickness and taper. For examination purposes, the examiner will assume that the applicant intended to claim that the contraction tapers have a substantially constant taper along at least a portion of their length.

6. Claim 18 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear how the "one or more output waveguides including an expansion taper configured to taper the width of the light signal traveling along the **input** waveguide". This appears to be a typographical error. The output waveguide expansion taper would taper the width of light signal traveling along the **output** waveguide, not the input waveguide as claimed. For examination purposes the examiner will assume that the expansion taper within the output waveguide tapers the width of the light signal propagating along the output waveguide instead of the input waveguide.

7. Claim 19 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear what is meant by the "thickness of at least a portion of the contraction tapers remains substantially constant along their length". The waveguides either have a constant thickness or they are tapered, it is unclear how they can have a constant thickness and taper. Claim 19 recites the limitation "the contraction tapers" in the first and second line. There is insufficient antecedent basis for this limitation in the claim. For examination purposes, the examiner will assume that the applicant intended to claim the expansion tapers remain substantially constant along their length.

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims 1-6, 8-12, 14, 15 and 17-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,434,302 to Fidric et al. in view of U.S. Patent No. 5,682,453 to Daniel et al.

Referring to claims 1, 6 and 18, the Fidric et al. reference discloses an optical device, comprising: multi-mode waveguides such that a plurality of the waveguides serve as input waveguides (30) and one or more of the waveguides (30,32) serve as an output waveguide, the waveguides intersecting one another such that light signals traveling along a plurality of the input waveguides are combined onto an output waveguide, at least a portion of the input waveguides including a taper (43) configured

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to taper the width of the light signal traveling along the input waveguide, one or more input waveguides including an expansion taper (33) configured to taper the width of a light signal traveling along the output waveguide. See Fig. 10-16 of the reference along with their respective portions of the specification. The Fidric et al. reference does not appear to specifically disclose the optical waveguides being positioned on a base. The Daniel et al. reference discloses the forming of fiber optic components (82) onto a base (80) for the purpose of maintaining the stability and relative position of the optical fibers, which prevents unwanted optical losses. (See the Summary Of The Invention section of the Daniel et al. reference for the benefits of securing the fiber optic components to a base. Also see Fig. 1-8 of the reference along with their respective portions of the specification for the mounting details. Since the Fidric et al. reference and the Daniel et al. reference are both from the same field of endeavor, the purpose disclosed by the Daniel et al. reference would have been recognized within the pertinent art of the Fidric et al. reference. It would have been obvious to one having ordinary skill in the art at the time the invention was made to mount the fiber optic coupler of Fidric et al. to a base as suggested by Daniel et al, for the purpose of maintaining the stability and relative position of the optical fibers, which prevents unwanted optical coupling losses within the device.

Referring to claims 2 and 19, the Fidric et al. reference discloses that the thickness of at least a portion of the contraction tapers (43) remains substantially constant along the length of the fibers (30) and the thickness of at least a portion of the

contraction tapers. See Fig. 10-16 of the reference along with their respective portions of the specification.

Referring to claim 3, the Fidric et al. reference discloses at least a portion of the contraction tapers (43) taper from an expanded end to a contracted end having a width less than 30% of the width of the expanded end. The Fidric et al. reference discloses the expanded end of the contraction taper ( $D_{input}$ ) to be in the range of 100  $\mu\text{m}$  to 125  $\mu\text{m}$ , while the contracted end of the combined fibers ( $D_o$ ) is in the range of 70  $\mu\text{m}$  to 130  $\mu\text{m}$  (See col. 8, lines 60-65). Based on Fig. 10, the most the diameter of the contracted end of the waveguides could be is one third of the value  $D_o$ , which would be around 23.3  $\mu\text{m}$  to 43.3  $\mu\text{m}$ . It is clear that the if the expanded waveguide width ( $D_{input}$ ) is 100  $\mu\text{m}$  and the contracted waveguide width is 23.3  $\mu\text{m}$ , then the contracted end has a width less that 30% of the expanded end.

Referring to claim 4, the Fidric et al. reference discloses the contracted ends of the contraction tapers are greater than 12  $\mu\text{m}$ . The Fidric et al. reference discloses the minimal diameter ( $D_o$ ) to be in the range of 70  $\mu\text{m}$  to 130  $\mu\text{m}$  (See col. 8, lines 60-65). Based on Fig. 10, the  $D_o$  appears to be approximately 3 times the width of the contracted ends of the waveguides (30).

Referring to claim 5, the Fidric et al. reference does not appear to specifically disclose that at least a portion of the contraction tapers having a taper ratio in a range of 8:1 to 200:1, the taper ration being a ratio of the taper length over the taper. The applicant does not disclose the criticality or an unexpected result from using this range of taper ratios. It would have been obvious to one having ordinary skill in the art at the

time the invention was made to utilize a taper ratio 8:1 to 200:1, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

Referring to claim 8, the Fidric et al. reference discloses the expansion tapers (33) expand from a contracted end to an expanded end, the contracted end ( $D_o$ ) having a width less than 80% of the width of the expanded end ( $D_{output}$ ). The Fidric et al. reference discloses the contracted end ( $D_o$ ) to be in the range of 70  $\mu\text{m}$  to 130  $\mu\text{m}$ , while the expanded end of the expansion taper ( $D_{output}$ ) is in the range of 200  $\mu\text{m}$  (See col. 8, lines 60-65). Even if the contracted end of the expansion taper is the maximum of 130  $\mu\text{m}$ , it is still less than 80% of the 200  $\mu\text{m}$  width of the expanded end of the expansion taper.

Referring to claim 9, the Fidric et al. reference does not appear to specifically disclose that at least a portion of the expansion tapers having a taper ratio in a range of 8:1 to 200:1, the taper ration being a ratio of the taper length over the taper. The applicant does not disclose the criticality or an unexpected result from using this range of taper ratios. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a taper ratio 8:1 to 200:1, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.



Referring to claim 10, the Fidric et al. reference discloses that the waveguide intersection is constructed such that a waveguide (32) configured to carry output from the intersection has a width greater than a width of each waveguide (30) configured to carry input to the intersection. See Fig. 10-16 of the reference along with their respective portions of the specification.

Referring to claim 11, the combination of the Fidric et al. reference and the Daniel et al. reference discloses that the lateral sides of the waveguides would extend down to the base. See Fig. 7 of the Daniel et al. reference, where the base (80) completely surrounds the waveguides (82).

Referring to claim 12, the Fidric et al. reference does not appear to specifically disclose that the waveguides are silicon. The applicant does not appear to specifically disclose the criticality of using silicon waveguides. Silicon is known in the art as a material that is well suited for use in optical waveguides and optical fibers. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use silicon waveguides, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

Referring to claim 14, the combination of the Fidric et al. reference and the Daniel et al. reference discloses the inactive regions spaces apart from the waveguides to define waveguide trenches adjacent to the waveguides. See Fig. 7 of the Daniel et al. reference, where the bonding composition (40) clearly fills an inactive, trench region adjacent to the waveguides (82).

Referring to claim 15, the Fidric et al. reference does not appear to specifically disclose the waveguides having a thickness between 16  $\mu\text{m}$  and 75  $\mu\text{m}$  and a width of 16  $\mu\text{m}$  to 75  $\mu\text{m}$ . The Fidric et al. reference instead discloses the waveguides to have a thickness and/or width of 100  $\mu\text{m}$  to 125  $\mu\text{m}$  (See col. 8, lines 60-65). The applicant does not appear to have disclosed the criticality of the claimed dimensions. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use waveguides having a thickness and/or width of 16  $\mu\text{m}$  to 75  $\mu\text{m}$ , since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

Referring to claim 17, the Fidric et al. reference discloses a plurality of light sources (44) for generating light signals, each light source would be positioned adjacent to the waveguide (82) such that light signals generated by the light source enters the input waveguides. See Fig. 10-16 of the reference along with their respective portions of the specification.

Referring to claim 20, the Fidric et al. reference does not appear to specifically disclose that at least a portion of the expansion tapers (33) taper from an expanded end to a contracted end having a width less than 30% of the width of the expanded end. The Fidric et al. reference discloses the expanded end of the expansion taper ( $D_{\text{output}}$ ) to be in the range of 200  $\mu\text{m}$ , while the contracted end of the expansion taper ( $D_o$ ) is in the range of 70  $\mu\text{m}$  to 130  $\mu\text{m}$  (See col. 8, lines 60-65). This puts the contracted end having a width of about 35% of the expanded end. However, the applicant does not

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appear to disclose the criticality of the contracted end of the expansion taper being less than 30% of the width of the expanded end. It would have been obvious to one having ordinary skill in the art at the time the invention was made to form the expansion taper with a contracted end having a width less than 30% of the width of the expanded end, since such a modification would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. In re Rose, 105 USPQ 237 (CCPA 1955).

Referring to claim 21, the Fidric et al. reference discloses the contracted ends of the contraction tapers are greater than 10  $\mu\text{m}$ . The Fidric et al. reference discloses the minimal diameter ( $D_o$ ) to be in the range of 70  $\mu\text{m}$  to 130  $\mu\text{m}$  (See col. 8, lines 60-65). Based on Fig. 10, the  $D_o$  appears to be approximately 3 times the width of the contracted ends of the waveguides (30).

Referring to claim 22, the Fidric et al. reference does not appear to specifically disclose that at least a portion of the expansion tapers having a taper ratio in a range of 8:1 to 200:1, the taper ratio being a ratio of the taper length over the taper. The applicant does not disclose the criticality or an unexpected result from using this range of taper ratios. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a taper ratio 8:1 to 200:1, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

***Allowable Subject Matter***

11. Claims 7, 13, and 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

12. The following is a statement of reasons for the indication of allowable subject matter:

Referring to claim 7, the prior art does not disclose that the expansion tapers do not taper vertically.

Referring to claim 13, the prior art does not disclose that one or more of the waveguides end at a facet that is substantially vertical relative to the base, each facet being angled at less than ninety degrees relative to the direction of propagation of the light signal traveling along the waveguide at the facet.

Referring to claim 13, the prior art does not disclose that the thickness of the waveguides is more than 1.4 times the width of the waveguide.

***Conclusion***

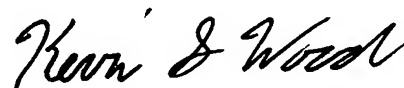
13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin S. Wood whose telephone number is (571) 272-2364. The examiner can normally be reached on Monday-Thursday (7am - 5:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney B. Bovernick can be reached on (571) 272-2344. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, reading "Kevin S. Wood". The signature is written in a cursive, flowing style.

Kevin S. Wood  
Patent Examiner